KIMBERLY MANOR (PWS #4010080)
SOURCE WATER ASSESSMENT OPERATOR FINAL REPORT

April 24, 2002

State of Idaho
Department of Environmental Quality

Executive Summary

Under the federal Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. The assessment for your particular system is based on a land use inventory of the designated source water area, sensitivity factors associated with each well, and characteristics of the aquifer that supplies your community with drinking water.

This report, *Source Water Assessment for the Kimberly Manor, located in Boise, Idaho,* describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within those boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The Kimberly Manor (PWS #4010080) drinking water system consists of a single well source. Well #1 rated an overall moderate susceptibility to inorganic compounds (IOCs), volatile organic compounds (VOCs), synthetic organic compounds (SOCs), and microbial contaminants. This rating is due, in large part, to the presence of numerous potential contaminant sources within the designated drinking water capture area; especially those located within the 3-year TOT zone (Table 1, pages 23-26). In addition, the Idaho Department of Environmental Quality (DEQ) could not locate a well log for the Kimberly Manor well. As a result, the overall susceptibility scores were slightly increased.

The well has not recorded the presence of any SOC or VOC during any water chemistry test. Although contaminant levels in the drinking water system have never exceeded current maximum contaminant levels (MCLs) for any of the pollutants regulated under the Safe Drinking Water Act, the Kimberly Manor should be aware that the potential for contamination still exists. The predominant land uses in the region of the water system are urban and commercial. DEQ considers these areas to be increasingly vulnerable to ground water contamination due to improper household hazardous waste disposal, urban runoff, and industrial pollution, just to name a few.

In December of 1998, a routine test for arsenic revealed a concentration of 13 ppb, which was safely below the previous arsenic MCL of 50 ppb. However, the MCL for arsenic was recently lowered from 50 ppb to 10 ppb by the EPA (October 31, 2001) allowing public water systems until 2006 to comply with the new standard. The Kimberly Manor water system may want to investigate treatment methods that could be implemented to reduce these levels of arsenic to avoid a future MCL violation. However, the most recent test for arsenic in November of 2001 did not detect any of the pollutant in the drinking water supply, so corrective measures may not be necessary. Nevertheless, the system should closely monitor the situation to determine what courses of action, if any should be employed. Recent documentation from the EPA indicates that they plan to make monetary assistance available to small water systems to help ease the financial burden of drinking water treatment methods. More information can be obtained from the EPA website (http://www.epa.gov).

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the Kimberly Manor, drinking water protection activities should first focus on continued maintenance of the sanitary seal and distribution system. Actions should also be taken to keep a 50-foot radius circle clear around the wellhead. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

Any spills occurring on State Street should be monitored and dealt with expeditiously. In addition, because a portion of the ground water capture zone is outside the direct jurisdiction of the Kimberly Manor, the creation of partnerships with state and local agencies and industry groups are critical to the success of drinking water protection. The system may want to cooperate with businesses located within the delineated drinking water capture zone to encourage pollution prevention practices and the implementation of best management practices (BMPs).

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan, especially since the delineation contains some urban and residential land uses. Public education topics could include proper lawn care practices, household hazardous waste disposal methods, and the importance of water conservation to name but a few.

There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. In addition, because a major transportation corridor (State Street) passes through the delineation, the Idaho Department of Transportation should be involved in any protection measures. Drinking water protection practices dealing with agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Ada Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Boise Regional Office of DEQ or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR THE KIMBERLY MANOR, BOISE, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are contained in this report (Attachment A, pages 17-26). The list of significant potential contaminant source categories and their rankings used to develop the assessment is also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess each drinking water source in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act Amendments of 1996. This assessment is based on a land use inventory of the delineated source water area, sensitivity factors associated with each well, and aquifer characteristics. Since there are over 2,900 public water sources in Idaho, there is limited time and resources available to accomplish the assessments. All of these assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

Kimberly Manor has a community public drinking water system serving approximately 66 people that is located in Ada County just south of State Street near Plantation Golf Course in Boise, Idaho (Figure 1, page 18). Residents receive their water from a single well source.

The water system has not had any significant water chemistry problems in its history. No VOCs or SOCs have ever been detected in routine drinking water samples. The IOCs fluoride and nitrate have been identified in the drinking water supply, but at levels safely below each respective MCL as established by the EPA. Nitrate levels have been quite low, averaging 1.8 ppm since 1993. This is less than 20% of the allowable limit for nitrate, which is 10.0 ppm.

In December of 1998, a routine test for arsenic revealed a concentration of 13 ppb, which was safely below the previous arsenic MCL of 50 ppb. However, the MCL for arsenic was recently lowered from 50 ppb to 10 ppb by the EPA (October 31, 2001) allowing public water systems until 2006 to comply with the new standard. The Kimberly Manor water system may want to investigate treatment methods that could be implemented to reduce these levels of arsenic to avoid a future MCL violation. However, the most recent test for arsenic in November of 2001 did not detect any of the pollutant in the drinking water supply, so corrective measures may not be necessary. Nevertheless, the system should closely monitor the situation to determine what courses of action, if any should be employed. Recent documentation from the EPA indicates that they plan to make monetary assistance available to small water systems to help ease the financial burden of drinking water treatment methods. More information can be obtained from the EPA website (http://www.epa.gov).

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (regions indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. DEQ contracted with BARR Engineering to perform the delineations using a combination of MODFLOW and a refined analytical element computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Boise Valley aquifer. The computer model used site specific data, assimilated by BARR Engineering from a variety of sources including area well logs, the Treasure Valley Hydrologic Project, and hydrogeologic reports (detailed below in Section 3).

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with these possible contamination sources, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in October and November of 2001. The first phase involved identifying and documenting potential contaminant sources within the Kimberly Manor source water assessment area (Figures 2a through 2d, pages 19-22) through the use of computer databases and Geographic Information System maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the system representative, Associated Property Management, to validate the sources identified in phase one and to add any other potential sources in the area.

The delineated source water area contains numerous potential sources of contamination. Each of these sites were incorporated into the susceptibility analysis and ultimately increased the overall ratings to moderate. Each potential source, along with the class of contaminants stored on site can be found in Table 1 (pages 23-26) of this report.

Section 3. Hydrologic Conditions of the Treasure Valley

Treasure Valley Hydrologic Project Information (Petrich and Urban, 1996; Neely and Crockett, 1998; Petrich et al., 1999)

The "Treasure Valley" is a geopolitical region that includes the lower Boise River sub-basin. The lower Boise River sub-basin begins where the Boise River exits the mountains near the Lucky Peak Reservoir. From Lucky Peak Dam the lower Boise River flows about 64 (river) miles northwestward through the Treasure Valley to its confluence with the Snake River. The Treasure Valley Hydrologic Project area encompasses the lower Boise River area, and extends south to the Snake River. The southern area is included in the study area because of ground water flow from the Lower Boise River basin south toward the Snake River.

Significant amounts of desert area were converted to flood irrigated agriculture beginning in the 1860s. Irrigation led to increases in shallow ground water levels in some regions. These shallow ground water levels provided an inexpensive and readily obtainable source of water supply that is used extensively throughout the valley. Much of the population growth in the Treasure Valley has been occurring in previously flood-irrigated agricultural areas, resulting in increased pumpage and a reduction in local aquifer recharge. In addition, irrigation in some areas has become more efficient, reducing the amount of irrigation-related infiltration. Decreasing aquifer recharge and increasing pumpage is thought to be contributing to the decline of ground water levels in some areas.

The Treasure Valley experiences a temperate and arid-to-semiarid climate. Average high temperatures range from about 90°F in summer to 36°F in winter; low temperatures range from about 20°F in winter to about 56°F in summer. The average precipitation ranges from about 8 to 14 inches throughout most of the valley, most of which falls during the colder months in the form of snow in higher elevations and rain in the low-lying valleys.

Major surface water bodies include the Boise River, Lake Lowell, and Lucky Peak Reservoir. The primary source of surface water in the Treasure Valley is the high elevation area in the Boise River basin upstream of Lucky Peak Dam. Much of the spring runoff from the snow pack in high elevation areas is stored in three reservoirs: Anderson Ranch Reservoir, Arrowrock Reservoir, and Lucky Peak Reservoir.

Regional cropland is irrigated primarily with surface water through an extensive network of reservoirs and canals. The first canals were constructed in the 1860's; there are now over 1,100 miles of major and intermediate canals in the Treasure Valley, the majority of which are owned and maintained by canal companies and irrigation districts. Primary sources of irrigation water in the Treasure Valley include the Boise, Snake, and Payette Rivers.

Hydrogeology (from Petrich et al., 1999)

The lower Boise River sub-basin (Treasure Valley) is located within the northwest-trending topographic depression known as the western Snake River Plain. The western Snake River Plain is a relatively flat lowland separating Cretaceous granitic mountains of west-central Idaho from the granitic/volcanic Owyhee mountains in southwestern Idaho. The western Snake River Plain extends from about Twin Falls, Idaho northwestward to Vale, Oregon. The Snake River Plain is about 30 miles wide in the section containing the lower Boise River.

Historically, sediments originating from the surrounding mountains began accumulating on top of thick, basal basalts. Rifting and continued subsidence maintained the lowland topography, leading to the additional accumulation of water and sediments (Othberg, 1994). Basin infilling by sediments and basalt occurred from the late Miocene through the late Pliocene (Othberg, 1994). Incision caused by flowing water in major drainages (e.g., Snake and Boise Rivers) began in the late Pliocene or early Pleistocene, although deposition of coarse sediments continued during Quaternary glaciations (Othberg, 1994).

Several Quaternary basalt flows have been described in the western Snake River Plain, and have been assigned to the upper Snake River Group (Malde, 1991; Malde and Powers, 1962). Lava flowed across portions of the ancestral Snake River Valley (Malde, 1991) in an area that is now south of the Boise River. The Snake River then changed course, incising at its present location along the southern margin of the basalt flows. More recent eruptions (from Kuna Butte and other local sources) spilled lava into the canyon south of Melba. The Snake River has since incised this basalt (Malde, 1991).

The general stratigraphy of the western Snake River Plain consists of (from top to bottom) a thick layer of sedimentary deposits underlain by a thick series of basalt flows, which in turn are underlain by older, tuffaceous sediments and basalt (Malde, 1991; Clemens, 1993). The upper thick zone of sediments (up to approximately 6,000 feet thick) distinguishes the western Snake River Plain from the eastern Snake River Plain, in which the upper section is primarily Quaternary basalt (Wood and Anderson, 1981).

The uppermost sediments and basalt belong to the Pleistocene-age Snake River Group. The Snake River Group consists of terrace sediments, Quaternary alluvium, and Pleistocene basalt flows (Wood and Anderson, 1981). Snake River Group sediments and basalts cover much of the project area (Othberg and Stanford, 1992).

The Snake River Group overlies the Idaho Group sediments. The Idaho Group sediments can be divided into two general parts (Wood and Anderson, 1981). The lower Idaho Group contains sediments described as lake and stream deposits of buff white, brown, and gray sand, silt, clay, diatomite, numerous thin beds of vitric ash, and some basaltic tuffs. The upper part of the lower Idaho Group also contains some local, thin, basalt flows. The upper Idaho Group consists of sands, claystones, and siltstones, but differs from the lower Idaho Group in that it contains a greater percentage of coarser-grained materials. The upper Idaho Group sediments are associated with a fluvial/deltaic/lacustrine depositional environment; the lower Idaho Group sediments were deposited in more of a lacustrine/deltaic environment (Wood, 1994).

Wood (1994) identified a buried lacustrine delta within the Idaho Group sediments in the Nampa-Caldwell area. The location of the delta in the middle of the western Snake River Plain suggests that the eastern part of the Boise River basin was delta plain and flood plain at the time of deposition, while the western part was a deep lake environment. The delta probably prograded northwestward into a lake basin 830 feet deep, based upon high resolution seismic reflection data and resistivity log interpretations. The delta-plain and front sediments were shown to be mostly fine-grained, well-sorted sand with thin layers of mud (Wood, 1994). The northwest trend of the delta indicates a sediment source to the southeast, such as where the Snake River flows today (Wood, 1994).

A substantial, laterally extensive layer of clay is found at depths of 300 to 700 feet below ground surface. The clay is important because it represents, in some areas, a significant aquitard separating shallow overlying aquifers from deeper zones. The clay, often described in well logs as having a blue or gray color, has been observed as far west as Parma, and as far east as Boise (although the clay is not found in the extreme eastern portions of the Treasure Valley). The clay varies from a few feet to a few hundred feet in thickness. Although significant layers of clay are present throughout the Idaho Group sediments, individual clay units are not necessarily continuous over large areas. Also, the top of the clay can vary in elevation by up to approximately 200 feet in some locations, such as in an area west of Lake Lowell. In general, sediments above the “blue clay” are coarser-grained than the interbedded sands, silts, and clays underlying the “blue clay.”

The top of the upper Idaho Group is marked in several parts of the Treasure Valley by a widespread fluvial gravel deposit known as the Tenmile gravels. Tenmile gravels contain rounded granitic rocks and felsic porphyries originating from the Idaho Batholith to the north and northeast. The Tenmile gravels range up to 500 feet in thickness along the Tenmile Ridge south of Boise, but are less than 50 feet thick in the Nampa-Caldwell area (Wood and Anderson, 1981).

Aquifer Systems and Hydrogeologic Characteristics

Ground water for municipal, industrial, rural domestic, and irrigation uses in the Treasure Valley is drawn almost entirely from Snake River Group and Idaho Group aquifers. Many domestic wells draw water from shallow aquifers, such as those in the Snake River Group deposits. Larger production wells (for municipal and agricultural uses) draw water from the deeper Idaho Group sediments.

Aquifers contained in the Snake River and Idaho Group sediments comprise shallow and regional ground water flow systems. Shallow aquifers contained in Snake River Group sediments and basalts may belong to local flow systems. Most local flow system recharge stems from irrigation infiltration and channel (e.g., streams or canals) losses. Discharge from shallow, local flow systems often is to local drains or streams. The time from recharge to discharge in shallow flow systems (residence times) probably ranges from days to tens of years.

In contrast, regional ground water flow systems extend much deeper than local flow systems. The Treasure Valley regional flow system begins in the eastern part of the valley, as indicated by downward hydraulic gradients in the Boise Fan sediments (Squires et al., 1992). Some water also enters the regional flow system as underflow from the Boise Foothills in the northeastern part of the valley. The regional flow system is thought to discharge primarily to the Boise and Snake Rivers in the western and southwestern parts of the valley.

Aquifer material characteristics, material heterogeneity, and structural controls influence Treasure Valley ground water flow. Coarse-grained materials (e.g., sand and gravel) in upper zones are more capable of transmitting ground water than fine-grained sediments (e.g., silt and clay). Clay and silt in the Snake River sediments can restrict vertical and/or horizontal ground water movement. Perched aquifers are created when fine-grained lenses impede downward vertical flow. A distinctive clay layer, sometimes referred to as "blue clay," is present over large portions of the valley. The clay is absent in the easternmost portions of the lower Boise River Basin, but can reach a thickness of more than 200 feet toward the central and western portions of the basin.

Sequences of interbedded sand, silt, and clay, such as the Deer Flat Surface and the upper portion of the Glenns Ferry Formation of the upper Idaho Group in the Nampa-Caldwell area, are the major water-producing aquifers in a large part of Canyon County (Anderson and Wood, 1981). The coarse-grained sediments in this zone produce water in excess of 2,000 gallons per minute (gpm).

The delineated source water assessment area for the Kimberly Manor can best be described as a southeastward trending corridor approximately five miles long and one-quarter mile wide (Figure 2a, page 19). The actual data used by BARR Engineering in determining the source water zones of contribution are available from DEQ upon request.

Section 4. Susceptibility Analysis

The water system's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Attachment B (pages 27-28) contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: 1) the surface soil composition, 2) the material in the vadose zone (region between the land surface and the water table), 3) the depth to first ground water, and 4) the presence of a 50-foot thick impermeable zone above the production interval of the well. Slowly draining fine-grained soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. For Kimberly Manor, regional soil information indicates the presence of poor to moderately draining soils in the vicinity. These soils may provide some additional protection to ground water by impeding the downward progress of contaminants in the unlikely event of a spill or release within the delineated drinking water capture zone.

Hydrologic sensitivity is moderate for the well (Table 2, page 11) because of the soil properties mentioned above. The Kimberly Manor drinking water system may have received an even lower ranking if an applicable well log could have been incorporated into the susceptibility analysis. Well logs typically contain valuable information regarding the below ground surface hydrogeologic properties which are very area specific.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have a better buffering capacity. In addition, if the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less probable. Also, if the wellhead is protected from surface flooding and is outside the 100-year floodplain, then the likelihood of contamination from surface events is reduced.

DEQ could not locate a well log for the Kimberly Manor water system. Therefore, information regarding the well depth, casing properties, production intervals, and depth of the annular seal is lacking. As a result, the system was assigned a moderate system construction score, which is fairly conservative, since some important data is missing. However, according to the 2000 Sanitary Survey conducted by the Central District Health Department, the well's surface seal is in good condition and should provide an adequate initial barrier to precipitation and other surface events. This tended to lower the system construction score to moderate.

Potential Contaminant Source and Land Use

In terms of the potential contaminant source/land use score, the well rated low for microbial contaminants (i.e. bacteria), moderate for IOCs (i.e. nitrates, arsenic) and SOCs (i.e. pesticides), and high for VOCs (i.e. petroleum products). These ratings can be attributed, in large part, to the presence of many potential contaminant sources within the designated drinking water capture area; especially those located within the 3-year TOT zone (Table 1, pages 23-26). One of the greatest potential sites of concern is State Street, which passes directly through the delineated drinking water capture zone. Because State Street serves as an important transportation thoroughfare for the region, it was considered a possible source of all classes of pollutants.

The predominant land use within the delineated region is urban/commercial. DEQ considers these areas to possibly be vulnerable to ground water contamination due to improper household hazardous waste disposal, industrial pollution, and urban runoff, just to name a few. In addition, the water system resides within a DEQ designated Group 1 Priority Area for the VOC perchloroethylene (PERC). The well may be subject to contamination from PERC, as it is quite prevalent in the region. A known PERC plume is present in the 10-year TOT zone (Figure 2d, page 22), resulting from a site that is currently regulated under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). CERCLA sites, more commonly known as Superfund sites, are designed to clean up hazardous waste sites that are on the national priority list (NPL).

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a repeat detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a wellhead will lead to an automatically high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0- to 3-year time of travel zone (Zone 1B) and the presence of agricultural land contribute greatly to the overall ranking.

The Kimberly Manor water system may have rated a lower overall susceptibility if an applicable well log could have been incorporated into the susceptibility analysis. Instead, the system rated a moderate overall susceptibility to all classes of contaminants (Table 1, page 11).

Table 1. Summary of the Kimberly Manor Susceptibility Evaluation

Well	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	**Final Susceptibility Ranking**			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	M	M	H	M	L	M	M	M	M	M

[1]**H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,**
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

A moderate hydrologic sensitivity and moderate system construction combined to give the well a moderate overall rating for all contaminants. Though there have been no significant water chemistry problems in the ground water, the Kimberly Manor water system should be aware that the potential for contamination does exist. The system does reside within an area of urban and commercial land uses, which may subject the Kimberly Manor well to various pollutants. However, no VOCs or SOCs have ever been detected in the water system.

Section 5. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the Kimberly Manor, drinking water protection activities should first focus on continued maintenance of the sanitary seal and distribution system. Actions should also be taken to keep a 50-foot radius circle clear around the wellhead. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

Any spills occurring on State Street should be monitored and dealt with expeditiously. In addition, because a portion of the ground water capture zone is outside the direct jurisdiction of the Kimberly Manor, the creation of partnerships with state and local agencies and industry groups are critical to the success of drinking water protection. The system may want to cooperate with businesses located within the delineated drinking water capture zone to encourage pollution prevention practices and the implementation of BMPs.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan, especially since the delineation contains some urban and residential land uses. Public education topics could include proper lawn care practices, household hazardous waste disposal methods, and the importance of water conservation to name but a few.

There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. In addition, because a major transportation corridor (State Street) passes through the delineation, the Idaho Department of Transportation should be involved in any protection measures. Drinking water protection practices dealing with agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Ada Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Boise Regional Office of DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Boise Regional DEQ Office (208) 373-0550

State DEQ Office (208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper, Idaho Rural Water Association, at (208) 373-7001 (mharper@idahoruralwater.com) for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund@ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

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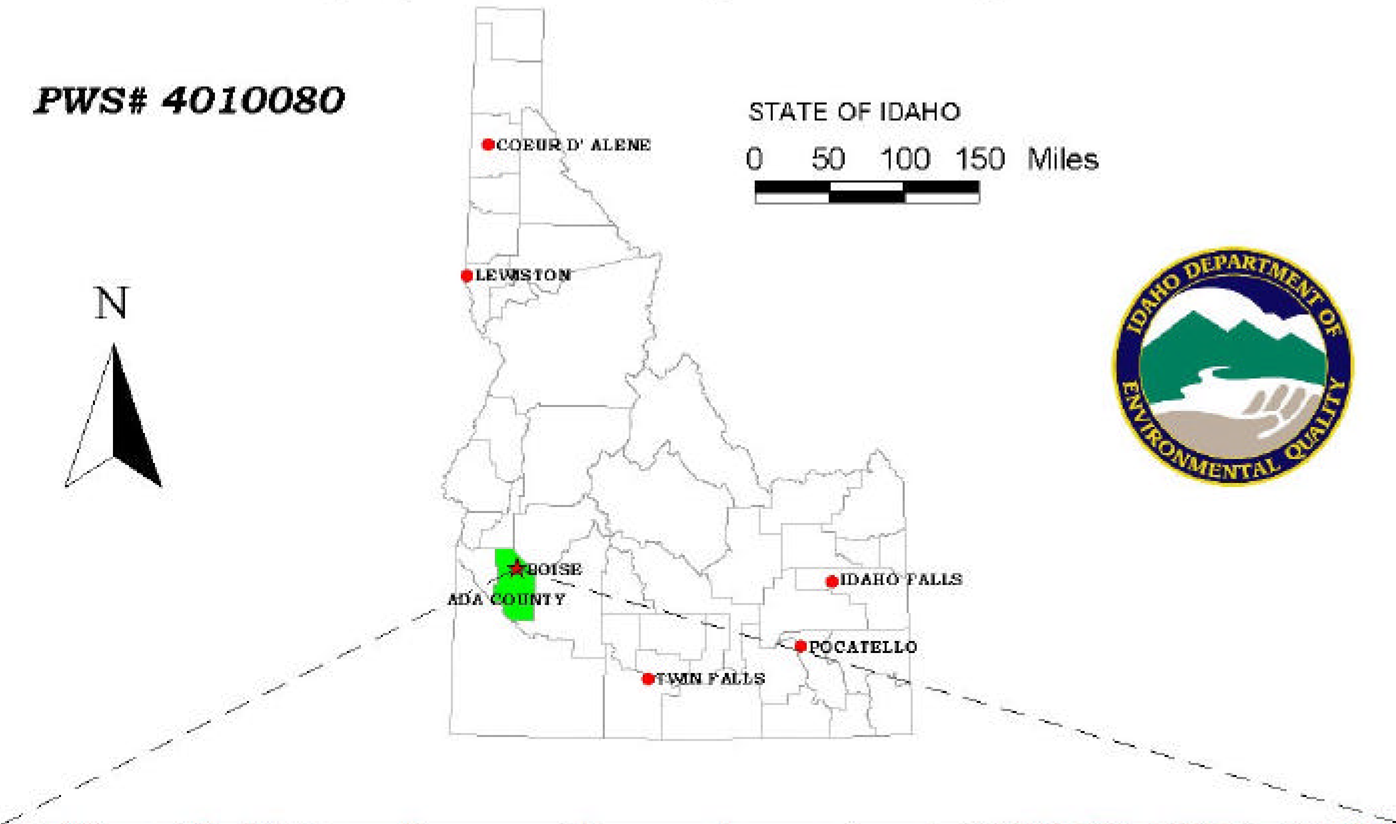
Attachment A

Delineation Figures and Potential Contaminant Source Tables for Kimberly Manor

FIGURE 1: Geographic Location of the Kimberly Manor

PWS# 4010080



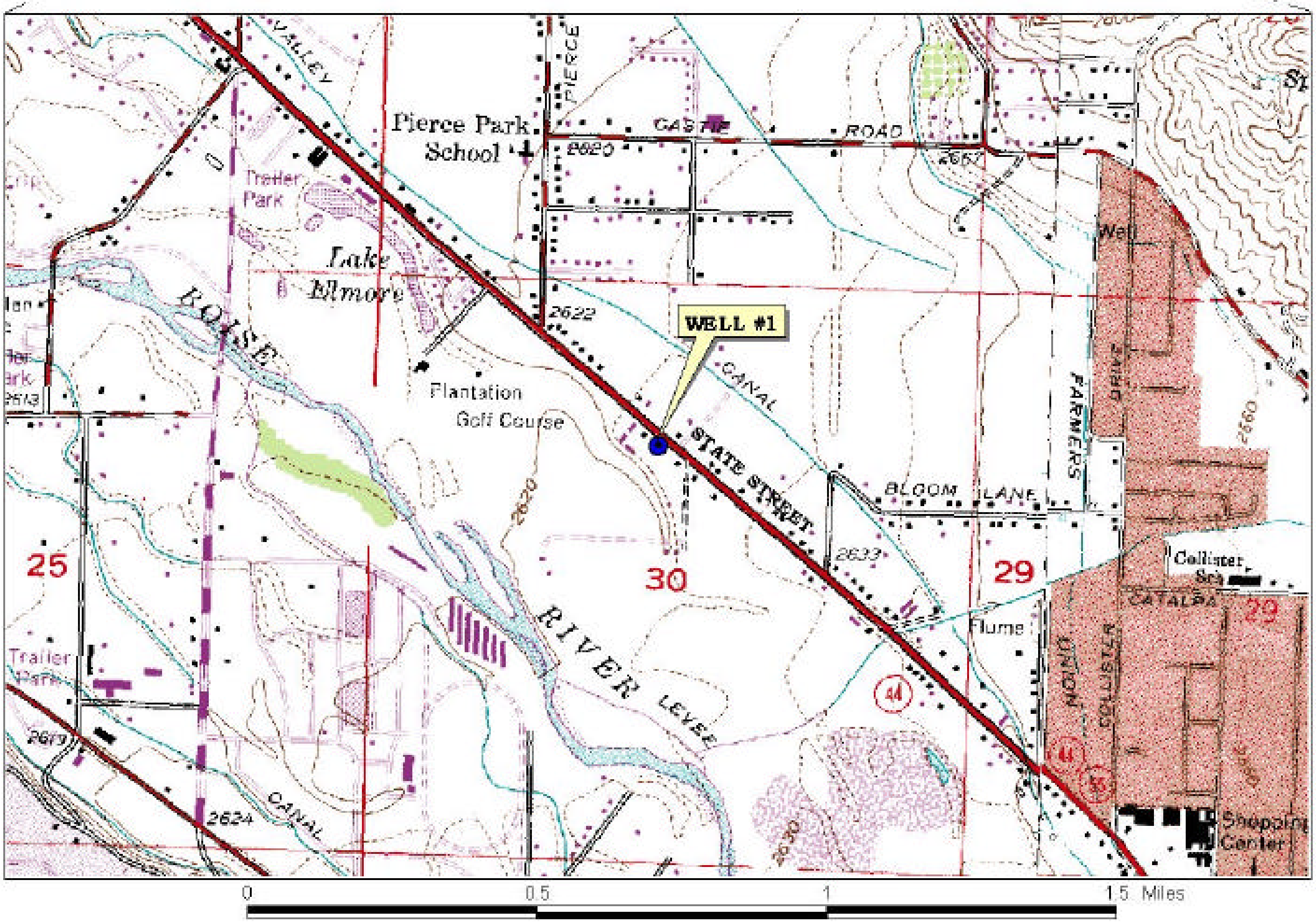


FIGURE 2a - Kimberly Manor Delineation Map and Potential Contaminant Source Locations

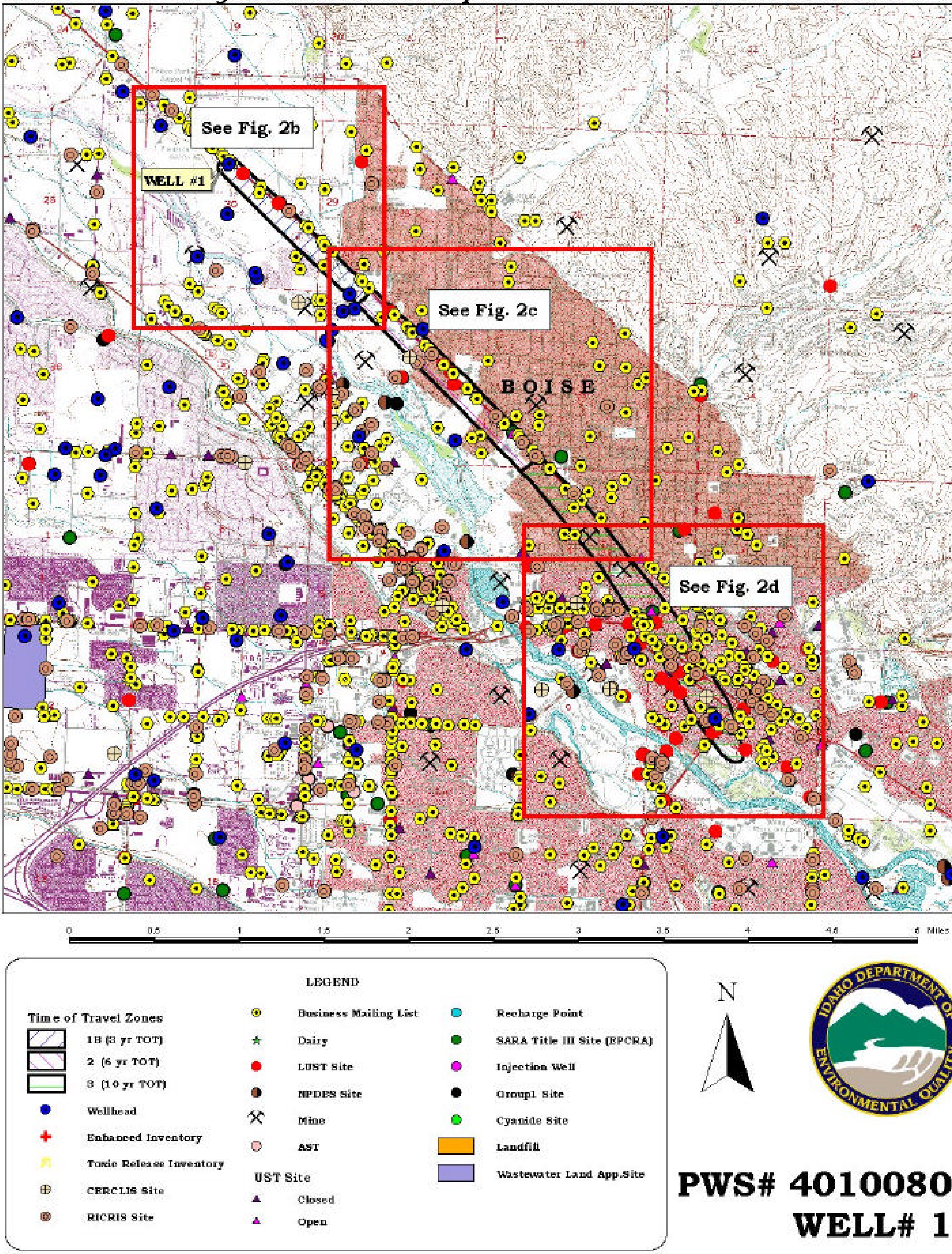
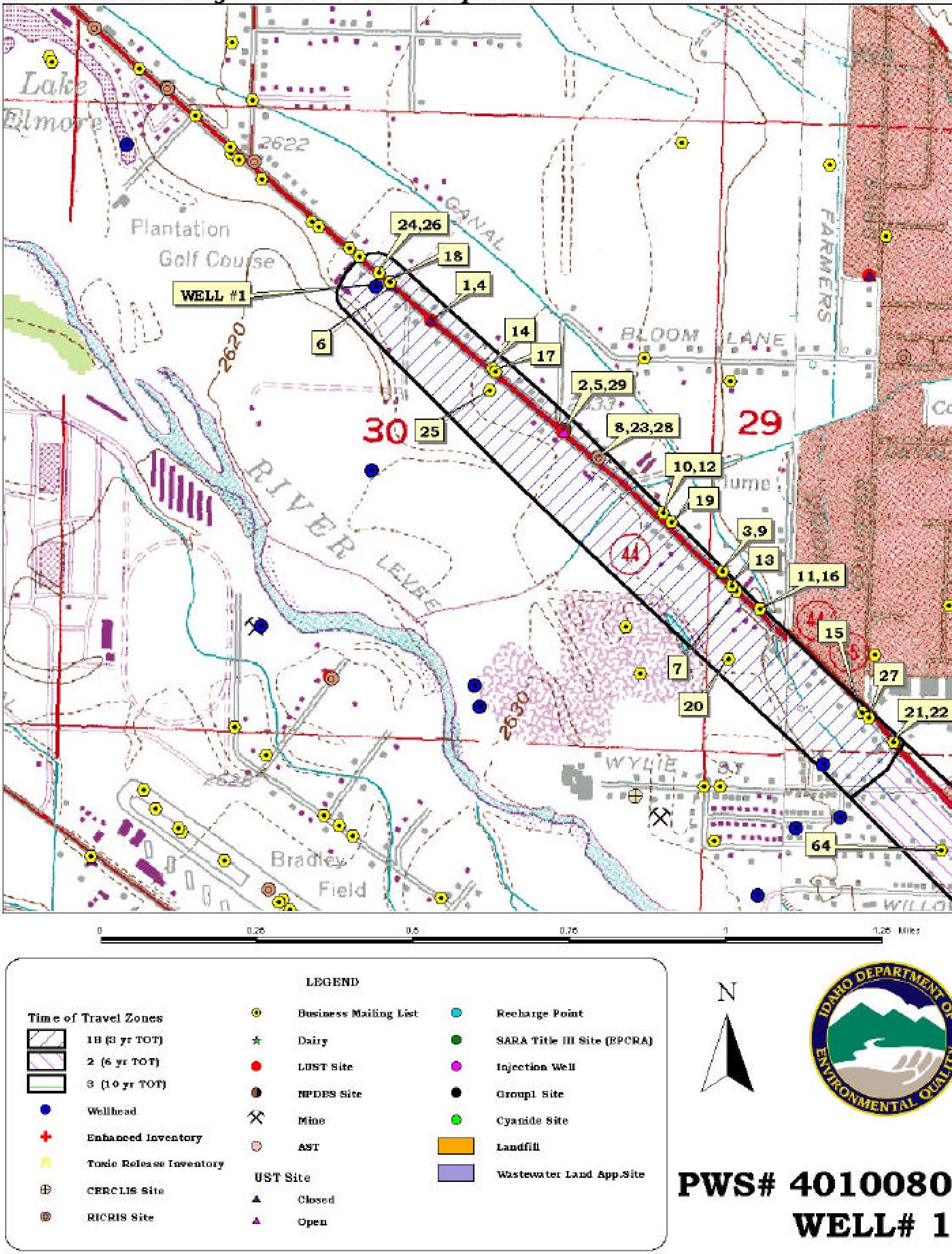


FIGURE 2b - Kimberly Manor Delineation Map and Potential Contaminant Source Locations



PWS# 4010080

WELL# 1

FIGURE 2c - Kimberly Manor Delineation Map and Potential Contaminant Source Locations

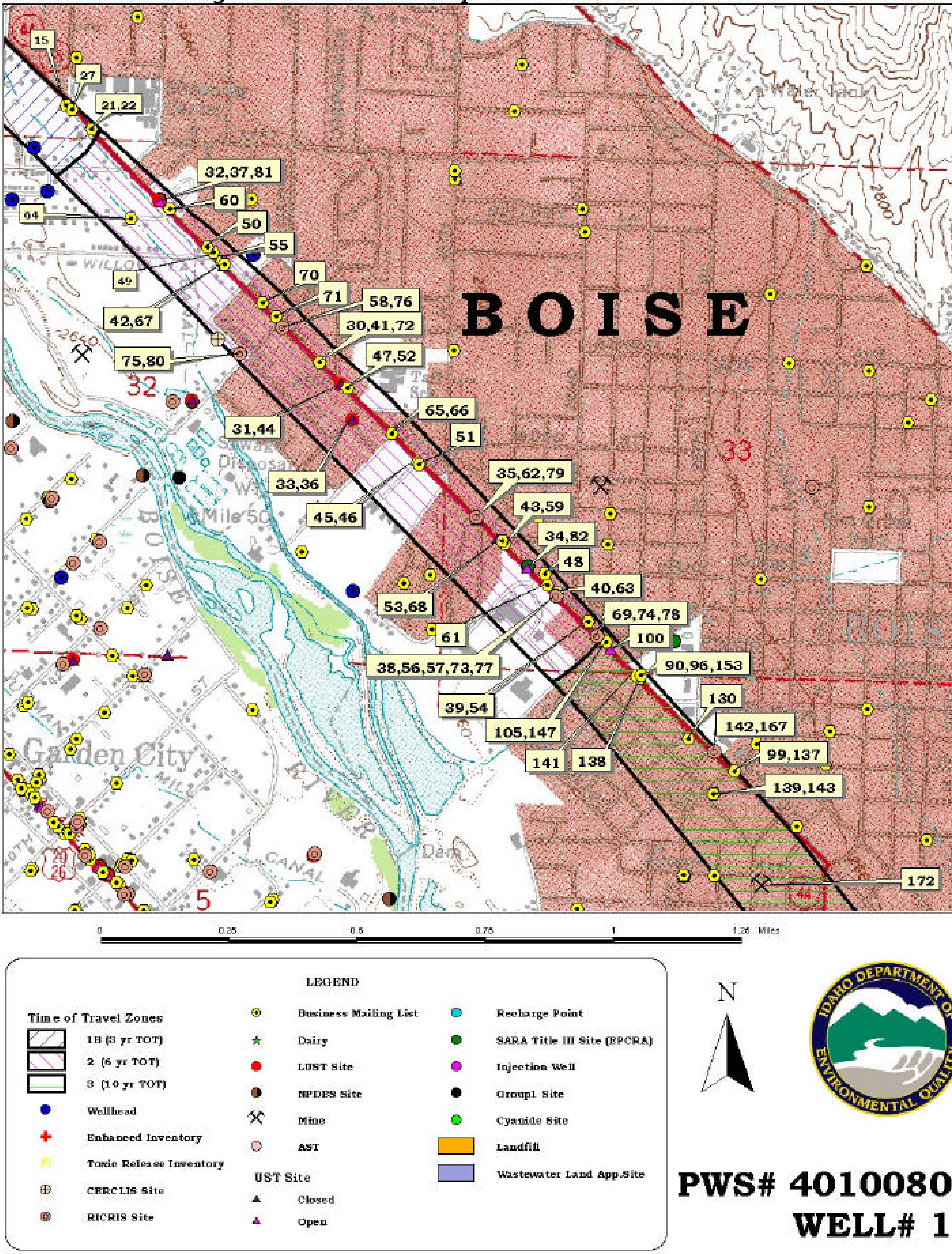
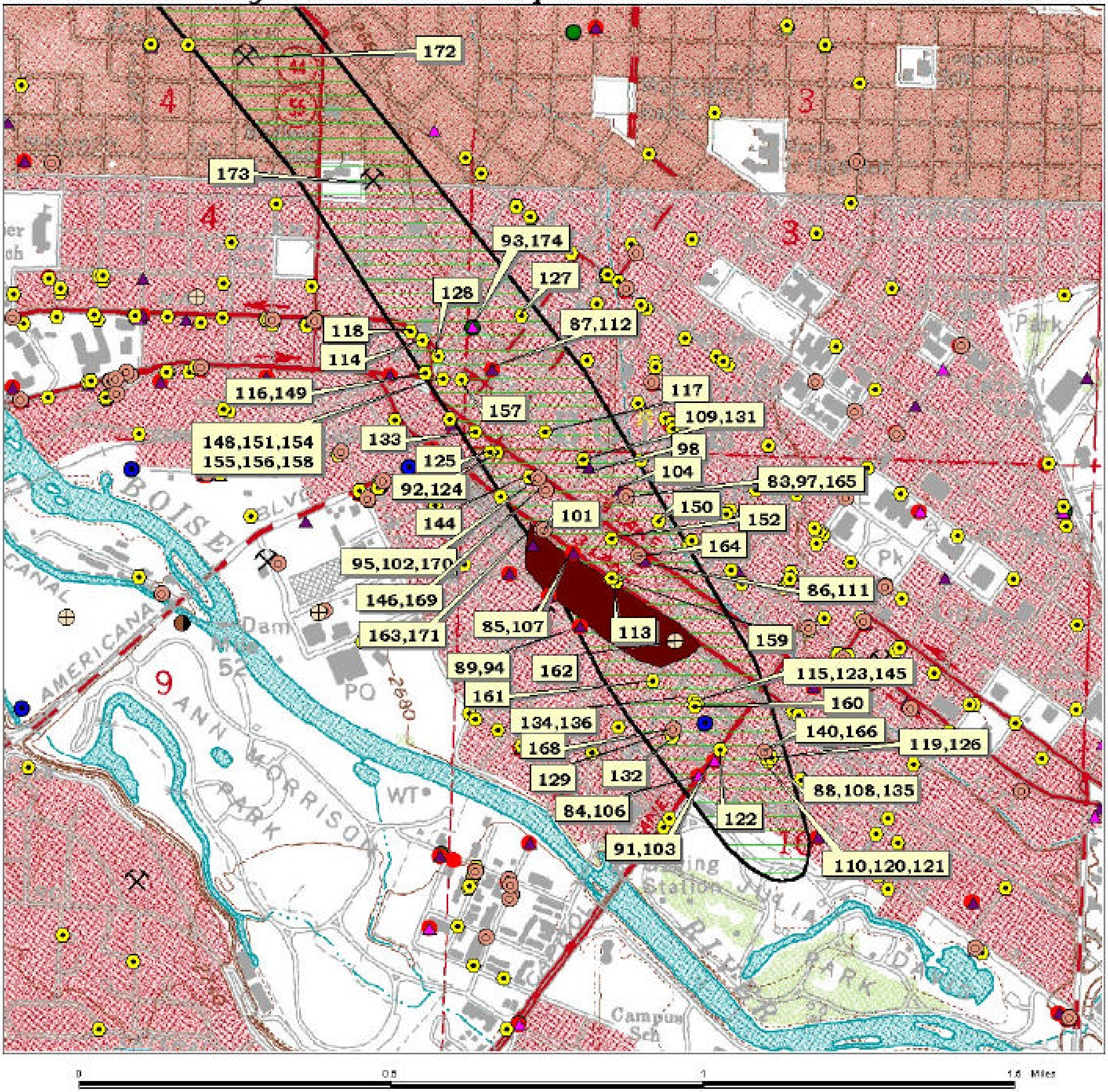


FIGURE 2d - Kimberly Manor Delineation Map and Potential Contaminant Source Locations



LEGEND

Time of Travel Zones

- 1B (3 yr TOT)
- 2 (6 yr TOT)
- 3 (10 yr TOT)
- Wellhead
- Enhanced Inventory
- Toxic Release Inventory
- CERCLIS Site
- RICRIS Site
- Business Mailing List
- Dairy
- LUST Site
- NPDES Site
- Mine
- AST

UST Site

- Closed
- Open
- Recharge Point
- SARA Title III Site (EPCRA)
- Injection Well
- Group1 Site
- Cyanide Site
- Landfill
- Wastewater Land App.Site

N

PWS# 4010080

WELL# 1

Table 2. Kimberly Manor Potential Contaminant Inventory

NOTE: The Site # in Table 1 refers to Figures 2a through 2d (pages 19-22).

SITE #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
	State Street	0-3	GIS Map	IOC, VOC, SOC, Microbes
1,4	LUST/UST Site-Gas Station Site Closed	0-3	Database Search	VOC, SOC
2,5,29	LUST/UST/SARA Site-Gas Station	0-3	Database Search	IOC, VOC, SOC
3,9	Closed UST Site Motorcycle Sales & Repair	0-3	Database Search	VOC, SOC
6	UST Site-Golf Club Site Closed	0-3	Database Search	VOC, SOC
7	Automobile Parts-Used & Rebuilt	0-3	Business Mailing List	IOC, VOC, SOC
8	Automobile Detail Shop	0-3	Business Mailing List	IOC, VOC, SOC
10,12	Lawn Maintenance & Landscaping	0-3	Business Mailing List	IOC, VOC, SOC, Microbes
11	Carpet & Rug Cleaners	0-3	Business Mailing List	VOC
13	Bicycles & Accessories	0-3	Business Mailing List	N/A
14	Veterinarian	0-3	Business Mailing List	IOC, SOC, Microbes
15	Automobile Parts-Used & Rebuilt	0-3	Business Mailing List	IOC, VOC, SOC
16	Curtain Manufacturer	0-3	Business Mailing List	N/A
17	General Contractor	0-3	Business Mailing List	IOC, VOC, SOC
18	Tire Dealers-Retail	0-3	Business Mailing List	IOC, VOC, SOC
19	Ceramic Tile Contractor & Dealer	0-3	Business Mailing List	IOC, VOC, SOC
20	Carport Manufacturers	0-3	Business Mailing List	IOC, VOC, SOC
21	Welding Company	0-3	Business Mailing List	IOC, SOC, VOC
22	Automobile Racing Car Equipment	0-3	Business Mailing List	IOC, VOC, SOC
23,28	RCRIS Site-Automobile Body Repair & Painting	0-3	Business Mailing List	IOC, VOC, SOC
24	Truck Rental & Leasing	0-3	Business Mailing List	IOC, VOC, SOC
25	Automobile Customizing	03	Business Mailing List	IOC, VOC, SOC
26	Automobile Repairing & Service	0-3	Business Mailing List	IOC, VOC, SOC
27	Automobile Dealers-Used Cars	0-3	Business Mailing List	IOC, VOC, SOC
30,41,72	LUST/UST Site-Rental Service Site Closed	3-6	Database Search	IOC, VOC, SOC
31,44	LUST/UST Site Site Closed	3-6	Database Search	VOC, SOC
32	LUST/UST/SARA Site Gas Station	3-6	Database Search	IOC, VOC, SOC
33,36	Closed LUST/UST Site-Automobile Repair Shop	3-6	Database Search	IOC, VOC, SOC
34,82	UST/SARA Site-Gas Station	3-6	Database Search	IOC, VOC, SOC
35,62,79	UST/RCRIS Site Oil Change Center	3-6	Database Search	IOC, VOC, SOC
38,56,57, 73,77	UST/RCRIS Site State Government Site	3-6	Database Search	IOC, VOC, SOC
39,54	UST Site-Gas Station	3-6	Database Search	VOC, SOC
40,63	UST Site-Used Auto Dealer	3-6	Database Search	IOC, VOC, SOC
42,67	UST Site-Golf Cart Dealer	3-6	Database Search	IOC, VOC, SOC
43	UST Site-Gas Station	3-6	Database Search	VOC, SOC
45,46	Used Automobile Dealer & Repair	3-6	Business Mailing List	IOC, VOC, SOC

SITE #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
47,52	Aircraft Equipment, Supplies, & Controls	3-6	Business Mailing List	IOC, VOC, SOC
48	Laboratory Testing	3-6	Business Mailing List	IOC, VOC, SOC
49	Sign Manufacturer	3-6	Business Mailing List	IOC, VOC, SOC
50	Tire Dealer-Retail	3-6	Business Mailing List	IOC, VOC, SOC
51	Used Automobile Dealer	3-6	Business Mailing List	IOC, VOC, SOC
53	Pest Control Business	3-6	Business Mailing List	IOC, VOC, SOC
55	Roofing Contractor	3-6	Business Mailing List	IOC, VOC, SOC
58,76	RCRIS Site-Automobile Body Repair & painting	3-6	Database Search	IOC, VOC, SOC
59	Horse Trainers	3-6	Business Mailing List	IOC
60	Cleaners	3-6	Business Mailing List	VOC
61	Automobile Parts & Supplies-Retail	3-6	Business Mailing List	IOC, VOC, SOC
64	General Contractor	3-6	Business Mailing List	IOC, VOC, SOC
65	Prepared Meat Products	3-6	Business Mailing List	IOC, VOC
66	General Contractor	3-6	Business Mailing List	IOC, VOC, SOC
68	Automobile Body Repair & Painting	3-6	Business Mailing List	IOC, VOC, SOC
69,78	RCRIS Site-Gas Station	3-6	Database Search	IOC, VOC, SOC
70	Storage-Household & Commercial	3-6	Business Mailing List	IOC, VOC, SOC
71	Print Shop	3-6	Business Mailing List	IOC, VOC
74	Truck Renting & Leasing	3-6	Business Mailing List	IOC, VOC, SOC
75,80	RCRIS Site/EPA Superfund Site Pest & Lawn Management Company	3-6	Database Search	IOC, VOC, SOC
83,97	LUST/UST Site-Auto Delaership Site Closed	6-10	Database Search	VOC, SOC
84,106	LUST/UST Site-Oil Company	6-10	Database Search	VOC, SOC
85,107	LUST/UST Site-Gas Station Site Closed	6-10	Database Search	VOC, SOC
86,111	LUST/UST Site-Gas Station Site Closed	6-10	Database Search	VOC, SOC
87,112	LUST/UST Site-Television Company Site Closed	6-10	Database Search	VOC, SOC
88,108,135	Closed LUST/UST Site General Contractor	6-10	Database Search	IOC, VOC, SOC
89,94	LUST/UST Site-Bus Company Site Closed	6-10	Database Search	VOC, SOC
90	LUST Site-Gas Station	6-10	Database Search	VOC, SOC
91,103	LUST/UST Site-Gas Station	6-10	Database Search	VOC, SOC
92,124	UST Site-Tire Dealer	6-10	Database Search	VOC, SOC
93,174	SARA Site/UST Site Food Processing-Dairy Products	6-10	Database Search	IOC, VOC, SOC
95,170	UST/RCRIS Site-Industrial Manufacturing	6-10	Database Search	IOC, VOC, SOC
96,138,153	UST Site-Car Wash Facility	6-10	Business Mailing List	IOC, VOC, SOC
98	UST Site-Utility Company	6-10	Business Mailing List	VOC, SOC
99	UST Site-Gas Station	6-10	Database Search	VOC, SOC
100	UST Site-Gas Station	6-10	Database Search	VOC, SOC
101	UST Site-Local Government Site Closed	6-10	Database Search	VOC, SOC

SITE #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
102	UST Site-Farming Equipment Store	6-10	Database Search	VOC, SOC
104	UST Site-Utility Company Site Closed	6-10	Database Search	VOC, SOC
105,147	UST Site-Used Automobile Dealer	6-10	Database Search	IOC, VOC, SOC
109	UST Site-Utility Company Site Closed	6-10	Database Search	VOC, SOC
110,120, 121	UST Site-Sign Manufacturers	6-10	Database Search	IOC, VOC, SOC
113	Automobile Transmission Service	6-10	Business Mailing List	IOC, VOC, SOC
114	Print Shop	6-10	Business Mailing List	IOC, VOC
115	Packaging Materials Manufacturers	6-10	Business Mailing List	IOC, VOC, SOC
116,149	Commercial Photographers	6-10	Business Mailing List	IOC, VOC
117	Tire Dealers-Retail	6-10	Business Mailing List	IOC, VOC, SOC
118	Used Automobile Dealer	6-10	Business Mailing List	IOC, VOC, SOC
119,126	Automobile Parts & Supplies	6-10	Business Mailing List	IOC, VOC, SOC
122	Helicopter-Charter & Rental Service	6-10	Business Mailing List	N/A
123	Frozen Food Processors	6-10	Business Mailing List	IOC, VOC
125	Sign Manufacturers	6-10	Business Mailing List	IOC, VOC, SOC
127	Delivery Service	6-10	Business Mailing List	VOC, SOC
128	Commercial Photographers	6-10	Business Mailing List	IOC, VOC
129	Portrait Photographers	6-10	Business Mailing List	IOC, VOC
130	Automobile Repair & Service	6-10	Business Mailing List	IOC, VOC, SOC
131	Automobile Repair & Service	6-10	Business Mailing List	IOC, VOC, SOC
132	Linen Supply Service	6-10	Business Mailing List	VOC
133	Automobile Parts & Supplies	6-10	Business Mailing List	IOC, VOC, SOC
134	Ceramic Tile Contractor & Dealer	6-10	Business Mailing List	IOC, VOC, SOC
136	Fish Hatchery Consulting	6-10	Business Mailing List	N/A
137	Used Automobile Dealer	6-10	Business Mailing List	IOC, VOC, SOC
139,143	Automobile Body Repair & Paint	6-10	Business Mailing List	IOC, VOC, SOC
140,166	RCRIS Site-Print Shop	6-10	Business Mailing List	IOC, VOC, SOC
141	Print Shop	6-10	Business Mailing List	IOC, VOC
142,167	RCRIS Site-Dry Cleaners	6-10	Business Mailing List	VOC, SOC
144	Automobile Parts & Supplies	6-10	Business Mailing List	IOC, VOC, SOC
145	Livestock Breeders	6-10	Business Mailing List	IOC
146,169	RCRIS Site-Automobile Repair Service	6-10	Business Mailing List	IOC, VOC, SOC
148	Aircraft Equipment Parts & Supplies	6-10	Business Mailing List	IOC, VOC, SOC
150	Road Building Contractors	6-10	Business Mailing List	IOC, VOC, SOC
151	General Contractor	6-10	Business Mailing List	IOC, VOC, SOC
152	Commercial Photographers	6-10	Business Mailing List	IOC, VOC
154,155, 156,157, 158	Federal Government	6-10	Business Mailing List	IOC, VOC, SOC
159	Wheels Retail	6-10	Business Mailing List	IOC, VOC, SOC
160	General Contractor	6-10	Business Mailing List	IOC, VOC, SOC
161	Taxicab Company	6-10	Business Mailing List	IOC, VOC, SOC

SITE #	Source Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
162	CERCLA Site	6-10	Database Search	IOC, VOC, SOC
163	RCRIS Site-County Government	6-10	Database Search	IOC, VOC, SOC
164	RCRIS Site-County Government	6-10	Database Search	IOC, VOC, SOC
165	RCRIS Site-Utility Company	6-10	Database Search	IOC, VOC, SOC
168	RCRIS Site-Print Shop	6-10	Database Search	IOC, VOC, SOC
171	RCRIS Site-Rail Company	6-10	Database Search	IOC, VOC, SOC
172	Sand & Gravel Pit	6-10	Database Search	IOC, VOC, SOC
173	Sand & Gravel Pit	6-10	Database Search	IOC, VOC, SOC

[1] Find Source Description definitions on page 14
[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

NOTE: The site number in this table corresponds to Figure 2, page 18.

Attachment B

Kimberly Manor Susceptibility Analysis Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report   Public Water System Name : KIMBERLY MANOR   Well# : WELL #1
Public Water System Number 4010080   2/13/02 2:38:17 PM

1. System Construction		SCORE			
Drill Date	UNKNOWN				
Driller Log Available	NO				
Sanitary Survey (if yes, indicate date of last survey)	YES	2000			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
	Total System Construction Score	4			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	YES	0			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
	Total Hydrologic Score	4			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
	Total Potential Contaminant Source/Land Use Score - Zone 1A	2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	19	20	20	3
(Score = # Sources X 2) 8 Points Maximum		8	8	8	6
Sources of Class II or III leacheable contaminants or	YES	4	11	1	
4 Points Maximum		4	4	1	
Zone 1B contains or intercepts a Group 1 Area	YES	0	2	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
	Total Potential Contaminant Source / Land Use Score - Zone 1B	12	14	9	6
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
	Potential Contaminant Source / Land Use Score - Zone II	3	3	3	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
	Total Potential Contaminant Source / Land Use Score - Zone III	2	2	2	0
Cumulative Potential Contaminant / Land Use Score		19	21	16	8
4. Final Susceptibility Source Score		12	12	11	10

5. Final Well Ranking	Moderate	Moderate	Moderate	Moderate